
Space Weather Forecast

Issued on Monday, 12 December 2022 at 13:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of Moderate-class X-ray flares throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low over the past 24 hours, with occasional low-level Common-class flares recorded. The largest of these flares was at 12/0036 UTC from the vicinity of one of the smaller groups in the northwest. No Coronal Mass Ejection (CME) was associated with this flare despite its drawn out X-ray signature.

This is just one of up to ten sunspot regions currently on the visible disc, with the 24-hour period seeing up to three new developing bipolar regions. All regions are now considered to be simple unipolar or bipolar regions, with the largest regions all relatively stable during the period with little change.

A 'disappearing filament' (arc of plasma) was noted from the southeast of the Sun around 11/1200-1300UTC in extreme UV and ground-based near-infrared imagery, with a northeast solar horizon 'prominence' (arc of plasma on the Sun's edge) erupting at a similar time. Neither of these was obviously attributable to any Earth-directed CME in imagery.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of the waning effects of a fast wind, with the solar wind speed slightly elevated throughout. The number of particles in the solar wind showed a roughly level tendency near the long-term background, while their magnetic field was stable and small-scale throughout. The north-south component of the field showed no protracted aligned or anti-aligned periods (with Earth's field).

The net result of the above solar wind measures was for Quiet to Unsettled geomagnetic activity (Kp 0-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a chance of isolated Moderate-class X-ray flares each day. Further arriving regions over the coming days may see a further slight increase in activity.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs currently feature in the forecast. There are up to two fast wind streams due in the four days, firstly the now declining high speed stream on day 1 (12th), but also potentially a minor fast wind that may graze Earth on day 2 (13th). Muted effects are predicted by persistence, if any. Geomagnetic activity is likely to be Quiet to Unsettled on days 1-3 (12th-14th), with chance of isolated Active intervals on day 2 (13th). Predominantly Quiet geomagnetic activity is expected by day 4 (15th).

Energetic Particles / Solar Radiation: Solar radiation storms should remain near background levels throughout, with a daily slight chance of seeing S1+ levels if any significant flares were to occur.

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Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	30	40	30	25
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)